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| VENABLE LLP P.O. BOX 34385 WASHINGTON, DC 20043-9998 | | | EXAMINER MACARTHUR, VICTOR L | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/857,348

Applicant(s)

PERSSON ET AL.

Examiner

Victor MacArthur

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-28,30 and 32-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-28,30 and 32-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 May 2007 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

The drawings were received on 5/29/2007. These drawings are acceptable for the purposes of examination.

The drawings are objected to under 37 CFR 1.84 for the following:

- Figure 4 as described in the specification is missing from the drawings. The two separate images associated with the labels "FIG.(a)" and "FIG.(b)" should each be separately labeled as --FIG.4a-- and --FIG.4b--, respectively.
- The numeral "9" as shown in newly amended FIG.(a) appears to be a typographical error and should be deleted.
- Figure 5 should be labeled as "prior art" since only that which is old and known is shown.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following limitations must be shown or canceled from the claims:

- "pointed tops" (line 2 of claim 24 and claim 33).
- "the side surface of the at least one bearing member comprises a plurality of grooves" (lines 1-2 of claim 25 and claim 34).
- "wherein the grooves penetrate and permanently deform the bearing member" (lines 1-2 of claim 26 and claim 35).

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- “spring force” (line 2 of claim 27 and claim 36).

No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 38 and 39 are objected to because of the following informalities:

- The phrase “the driving means” (last line of claims 38 and 39) lacks proper antecedent basis and should be replaced with --a driving means--.

Appropriate correction is required. For purposes of examining the instant invention, the examiner has assumed these corrections have been made.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23-28, 30 and 32-39 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Line 5 of claim 38 recites "a joint socket enclosing the joint housing". ~~Line~~ Applicant has not pointed out where the amended claim is supported, nor does there appear to be a written description of the claim limitation in the application as filed such that this limitation constitutes new matter. Claim 39 also contains this limitation in line 10 and is thus similarly rejected. All remaining claims ultimately depend from either claim 38 or claim 39. Applicant's joint socket (1) as shown in figure 1 includes a housing (2) and bearing (3). That is to say that the applicant's socket (1) is not separate from applicant's housing (2) such that it can enclose the housing. The examiner suggests replacing the term "enclosing" with --including-- to overcome this rejection.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 23-28, 30 and 32-39 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The term "only the one-half of joint ball or only a portion of the one-half of the joint ball and only a portion of another half of each joint ball" (10-12 of claim 38) lacks proper antecedent basis and is otherwise ambiguous thereby rendering the claims unclear. Does the applicant mean to refer to the previously set forth "approximately one-half the joint ball or less" (lines 6-7 of claim 38). How can the bearing surface engage "only the one-half of joint ball" and "only a portion of another half of each joint ball" both at the same time? That is to say if a first element contacts only a second element how can it also contact a third element, much less only a third element. For purposes of rejection under the prior art, the examiner assumes the term to mean that the bearing surface engages the "approximately one-half the joint ball or less" that was previously set forth in lines 6-7 of claim 38. Claim 39 contains similar phraseology and is thus similarly rejected.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-28, 30 and 32-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clavel (U.S. Patent 4,976,582) in view of Latzen (U.S. Patent 2,733,085) and Matsuoka (U.S. Patent 4,430,016).

Claim 38. Clavel discloses (fig.2) a delta robot, comprising: a multi-link system including a plurality of rods (4) and a plurality of joints (ball and socket joints 26a, 26b, 27a, 27b

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as described in col.3, ll.43-45) arranged at the ends of the rods. Clavel does not expressly state the specific details of the ball and socket joints. Latzen teaches (fig.1) that it is desirable for ball and socket joints to have the following details: each joint comprising a joint ball (1), a joint bearing (7) engaging the joint ball, a joint housing (portion of 2 enclosing 7) enclosing the joint bearing, and a joint socket (2) enclosing the joint housing (in as much as the applicant's own invention does, see 112 1st paragraph rejection above), the joint socket extending about the joint ball **approximately** (but not necessarily exactly) one-half the joint ball or less, the joint bearing comprising at least one removable annular bearing member (7) arranged easily replaceable to eliminate uneven wear in the joint, the bearing member comprising a bearing surface (surface of 7) engaging only the one-half of joint ball or only a portion of the one-half of the joint ball and only a portion of another half of each joint ball (in as much as the applicant's invention does, see 112 2nd paragraph rejection above), the joint housing comprising a housing surface (surface of 2 contacting side of 7) against which a side surface of the bearing member abuts, the housing surface comprising a plurality of friction-increasing grooves (grooves in 2 receiving 15) extending in a longitudinal direction of the housing surface, the grooves engaging the side surface of the at least one bearing member and being operative to increase friction between the at least one bearing member and the housing surface to rotationally immobilize the at least one bearing member in the housing during operation of the driving means. Latzen states that such specific details are desirable for improving tolerances and lubricating conditions (col.1, ll.23-25). Neither Clavel nor Latzen expressly state what material the bearing should be made of. Matsuoka teaches (figs.1 and 3) that it is desirable to make bearings (4) from a polymeric friction minimizing material for the purpose of improving lubrication (col.3, ll.13-17). Therefore, it

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would have been obvious to one with ordinary skill in the art at the time the invention was made to use ball and socket joints, with details taught by Latzen and Matsuoka, for the ball and socket joints of Clavel, since such details are desirable for improving tolerances and lubricating conditions, and further since Clavel is silent on the matter of ball joint details thus motivating one concerned with recreating the Clavel assembly to seek out teachings on ball joint details.

Claim 39. Clavel discloses (fig.2) a method for forming a delta robot operative to position a movable element in relation to a fixed element, the method comprising: providing a plurality of linkage structures (4, 26a, 26b, 27a, 27b), each comprising a plurality of pull rods (4) and a plurality of joints (ball and socket joints 26a, 26b, 27a, 27b as described in col.3, ll.43-45) arranged at the ends of the rods. Clavel does not expressly state the specific details of the ball and socket joints. Latzen teaches (fig.1) that it is desirable for methods including steps of forming ball and socket joints to have the following steps: providing the joint with a joint ball (1), providing a joint bearing (7) engaging the joint ball, the joint bearing comprising a bearing surface (surface of 7) engaging only the one-half or joint ball or only a portion of the one-half of the joint ball and only a portion of another half of each joint ball (in as much as the applicant's invention does, see 112 2nd paragraph rejection above); providing a joint housing (portion of 2 enclosing 7) enclosing the joint bearing, providing a joint socket (2) enclosing the joint housing (in as much as the applicant's own invention does, see 112 1st paragraph rejection above), the joint socket extending about the joint ball **approximately** (but not necessarily exactly) one-half the joint ball or less, wherein providing the joint bearing comprises the joint bearing comprises arranging in the joint housing at least on removable annular bearing member (7) arranged easily replaceable to eliminate uneven wear in the joint, wherein the joint housing comprising a

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housing surface (surface of 2 contacting 7) against which a side surface of the bearing member abuts, the housing surface comprising a plurality of friction-increasing grooves (grooves in 2 receiving 15) engaging the side surface (as seen in fig.1) of the at least one bearing member and being operative to increase friction between the at least one bearing member and the housing surface to rotationally immobilize the at least one bearing member in the housing during operation of the driving means. Latzen states that such specific steps are desirable for improving tolerances and lubricating conditions (col.1, ll.23-25). Neither Clavel nor Latzen expressly state what material the bearing should be made of. Matsuoka teaches (figs.1 and 3) that it is desirable to make bearings (4) from a polymeric friction minimizing material for the purpose of improving lubrication (col.3, ll.13-17). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use ball and socket joints, with details taught by Latzen and Matsuoka, for the ball and socket joints of Clavel, since such details are desirable for improving tolerances and lubricating conditions, and further since Clavel is silent on the matter of ball joint details thus motivating one concerned with recreating the Clavel assembly to seek out teachings on ball joint details.

Claim 23. Latzen further teaches the specific detail of the grooves being aligned at an angle (zero degrees such that the grooves are parallel to the longitudinal axis of the bearing) with respect to a longitudinal axis of the bearing member. Note that the preferred embodiment of the applicant's invention also comprises an angle of zero degrees such that the grooves are parallel with the longitudinal axis (Specification, p.3, ll.27-30). It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 24. Latzen further teaches the specific detail of the grooves including pointed tops (as seen in fig.1). It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 25. Latzen further teaches the specific detail of the at least one bearing member comprising a plurality of grooves (15) extending in a longitudinal direction of the side surface and compatible with the grooves in the housing. It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 26. Latzen further teaches the specific detail of the grooves penetrating with the bearing member being permanently deformed (into its final product shape as seen in fig.1). It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above. The limitation “permanently deform” describes a method of forming. The method of forming is not germane to the issue of patentability of the device itself. Therefore, the limitation “permanently deform” has been given patentable weight only where it results in a positive structural difference in the final product structure. See MPEP § 2113.

Claim 27. Latzen further teaches the specific detail of the housing and the bearing member each having a socket shape, wherein a spring force (contact force) holds the ball and socket joint together (in as much as the applicant’s invention does) and fixes the bearing member in place. It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 28. Latzen further teaches the specific detail of the at least one bearing member being pressed to fit tightly in the housing (in as much as the applicant’s invention is). The method of forming is not germane to the issue of patentability of the device itself. Therefore, the

limitation "pressed" has been given patentable weight only where it results in a positive structural difference in the final product structure. See MPEP § 2113.

Claim 30. The above modification fixes a location of the bearing member in the robot (in that it is not free to move after installation).

Claim 32. Latzen further teaches the specific detail of the grooves being aligned at an angle (zero degrees such that the grooves are parallel to the longitudinal axis) with respect to a longitudinal axis of the bearing member. Note that the preferred embodiment of the applicant's invention also comprises an angle of zero degrees such that the grooves are parallel with the longitudinal axis (Specification, p.3, ll.27-30). It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 33. Latzen further teaches the specific detail of the grooves including pointed tops (as seen in fig.1). It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 34. Latzen further teaches the specific detail of the at least one bearing member comprising a plurality of grooves (15) extending in a longitudinal direction of the side surface and compatible with the grooves in the housing. It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 35. Latzen teaches that the formation includes the step of the grooves of the bearing penetrating and permanently deforming the housing to form complementary grooves in the housing, rather than the reverse method as claimed by the applicant. The reversal of components in a prior art reference is a design consideration within the skill of the art. In re Gazda, 219 F.2d 449, 104 USPQ 400 (CCPA 1955); In re Japikse, 181 F.2d 1019, 86 USPQ 70

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(CCPA 1950). One of ordinary skill in the art would easily recognize that the reversal would better allow for replacement of worn bearings since each new bearing would be deformed to fit the housing exactly. Therefore, it would have been obvious to reverse steps of forming such that grooves in the housing deform the bearing to form complementary grooves therein, since such practice better allows for replacement of bearings and such modification is a design consideration within the skill in the art.

Claim 36. Latzen further teaches the specific detail of the housing and the bearing member each having a socket shape, wherein a spring force (contact force) holds the ball and socket joint together (in as much as the applicant's invention does) and fixes the bearing member in place. It would have been obvious to include this additional detail by the same reasoning stated in the rejection of claim 21 above.

Claim 37. Latzen further teaches the specific detail of the at least one bearing member being pressed to fit tightly in the housing (in as much as the applicant's invention is).

Response to Arguments

Applicant's arguments with regard to the claim rejections have been fully considered but they are not persuasive.

Regarding the Drawings:

The applicant argues that figure 5 need not be labeled as prior art since it includes subject matter that was not known prior to applicant's invention. This is not persuasive. First, applicant has failed to identify any specific elements in figure 5 that are not prior art. Second, applicant's specification as originally filed (p.1, ll.10-15) stated that figure 5 was prior art. Once an

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applicant admits that a figure is prior art such admission cannot be retracted. Also note that applicant's figure 5 as filed on July 11, 2006 clearly labeled figure 5 as prior art.

The applicant argues that the drawings show the bearing member installed in the socket which in and of itself is enough to satisfy a showing of the grooves engaging and deforming the bearing member as still recited in claim 35. This is not persuasive. It is not necessary for a bearing member that is being installed in a socket to be so installed through a process of deformation. The applicant's drawings do not depict any process of deformation nor do they depict any final product structure unobtainable from a non-deforming assembly procedure (i.e. a bearing member preformed to fit grooves).

Regarding the prior art rejections:

The applicant argues that Clavel discloses cardan joints rather than the claimed ball and socket joints. This is not persuasive. Clavel discloses that the cardan joints can be replaced with ball and socket joints (col.3, ll.43-45) and it is this ball and socket embodiment that is relied upon to reject the applicant's claims. Accordingly, the applicant's cardan joint illustrations and arguments are irrelevant to Clavel's explicit disclosure of a ball and socket joint embodiment.

The applicant argues that figure 1 of Latzen shows a cut away view of the joint housing thereby implying that the actual housing would extend over nearly the entire ball if shown without cut away. This is not persuasive. Firstly, drawings and pictures anticipate claims if they show the structure which is claimed. The origin of a drawing used as prior art is immaterial and **it does not matter that the feature shown is unintended or unexplained** (emphasis added). *In re Aslanian*, 590 F.2d 911. 200 USPQ 500 (CCPA 1979). See MPEP § 2125. Accordingly, figure 1 shows a ball (1) that has nearly its entire top half exposed beyond a housing (2). The

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question of whether Latzen intends for the housing to extend further than shown in figure 1 is irrelevant since the rejection of applicant's claims is based on what is actually shown in figure 1 rather than what might be intended or hoped for by the applicant. Applicant's references to figures 3 and 4 are similarly irrelevant to what figure 1 actually shows. However, for the sake of argument, the applicant should note that the figure 3 shows a bearing and ball (no housing) and figure 4 shows two distinct sections (top section, and bottom section sandwiching bearing 8 therebetween), either one of which could be referred to as a housing that surrounds about 1/3 of the ball (i.e., much less than 1/2)... or both of which could be referred to as a two piece housing that surrounds about 2/3 of the ball (i.e., approximately 1/2). In any case figures 3 and 4 show embodiments that are different from that which is shown in fig. 1 and therefore cannot be relied upon to interpret what might be intended or implied in figure 1.

The applicant argues that Matsuoka suggests a socket structure that entirely surrounds the ball. This is not persuasive since Matsuoka is relied upon to teach material choice not dimension or shape. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The applicant argues that the prior art does not disclose the applicant's "stroke time of about 0/5 sec.". This is not persuasive since this limitation is not recited in the claims.

Conclusion

Applicant's amendment (i.e., the newly added limitation "only the one-half of joint ball or only a portion of the one-half of the joint ball and only a portion of another half of each joint ball" in claims 38 and 39) necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor MacArthur whose telephone number is (571) 272-7085. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on (571) 272-7087. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

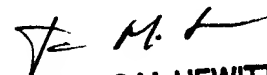
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197.



VLM

July 30, 2007


JAMES M. HEWITT
PRIMARY EXAMINER



Replacement Sheet

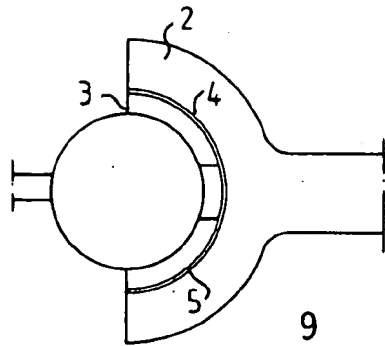


FIG. (a)

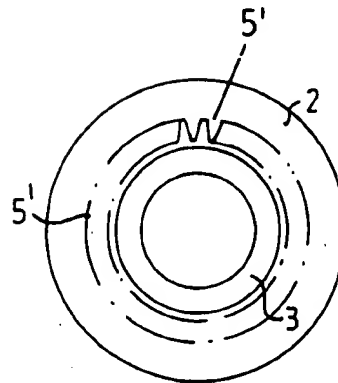


FIG. (b)

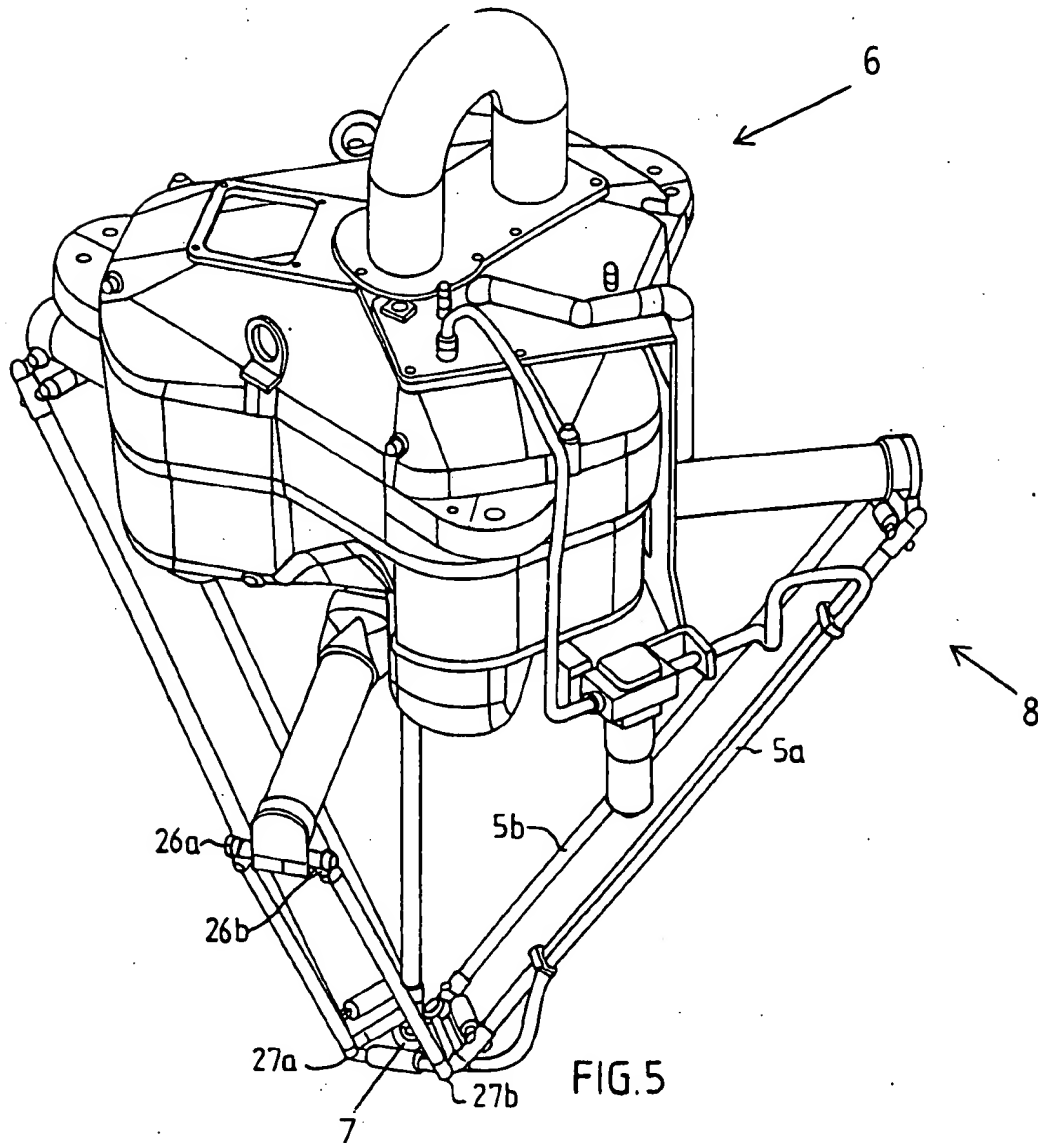


FIG. 5

Acceptable
 per
 7/30/07